

# MONTANA DIABETES SURVEILLANCE & CLINICAL COMMUNICATION



Montana Department of Public Health and Human Services  
Chronic Disease Prevention and Health Promotion Program  
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## INCREASING PREVALENCE OF DIAGNOSED DIABETES AND OBESITY AMONG ADULT MONTANANS FROM 1988-1993 TO 1994-1999.

### WHAT'S INSIDE

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Increasing prevalence of  
diagnosed diabetes and  
obesity among adult  
Montanans from  
1988-1993 to 1994-1999.

### BACKGROUND:

Diabetes is a major cause of morbidity and mortality for both Montanans and persons in the United States.<sup>1</sup> Diabetes is the seventh leading cause of death among all Montanans and the fourth leading cause of death among Montana's American Indians.<sup>2</sup> In Montana, diabetes is associated with approximately 7,500 annual hospitalizations per year, including 2,300 related to cardiovascular disease, 151 for lower extremity amputations, 63 for new cases of end stage renal disease and 41 for new cases of blindness.<sup>3</sup> Health care costs associated with diabetes are extremely high. The direct and indirect costs are estimated at \$336 million dollars annually in Montana.<sup>3</sup> Studies from 1988-1994 have indicated that both the prevalence and incidence of diabetes are increasing in the U.S.<sup>4-7</sup> A recent study found that the prevalence of diagnosed diabetes increased 1.6 percentage points, from 4.9% in 1990 to 6.5% in 1998 in the U.S. — an overall relative increase of 33%.<sup>8</sup> To evaluate recent trends in diabetes prevalence in Montana, we examined data from the Behavioral Risk Factor Surveillance System survey (BRFSS), a population-based survey of adult Montanans.

## METHODS:

The Montana DPHHS has conducted a yearly BRFSS telephone survey of adult Montanans aged 18 years since 1984. Beginning in 1988, respondents were asked “Have you been told by a doctor that you have diabetes?” From 1988 to 1992, the responses to this question were coded as “yes” or “no.” In 1993, interviewers coded gestational diabetes as “no.” Subsequently in 1994, interviewers coded gestational diabetes as a separate category. In order to compare trends in the prevalence of diagnosed diabetes we coded gestational diabetes as “yes” from 1994 to 1999. Crude, unweighted prevalence estimates for diagnosed diabetes were calculated and compared for two 6-year time periods, 1988 to 1993 and 1994 to 1999. A body mass index (BMI) was calculated for respondents based on their self-reported height and weight. Those respondents whose BMI was  $\geq 25.0$  kg/m<sup>2</sup> were classified as overweight and those with a BMI  $\geq 30.0$  kg/m<sup>2</sup> were classified as obese. The 1988-93 and the 1994-99 BRFSS surveys included 7,124 and 9,591 adult Montanans, respectively.

## CHARACTERISTICS OF MONTANA BRFSS RESPONDENTS, 1988-93 AND 1994-99:

The majority of respondents from both time periods were women and were white (Table 1). There were no differences in the sex or race distributions of respondents in these two time periods. Those surveyed from the 1994-99 were slightly older compared to respondents from the 1988-93 surveys (51% vs. 48% were aged  $\geq 45$  years). Between 1988-93 and 1994-99 the prevalence of overweight increased by 7 percentage points and obesity by 4 percentage points.

Table 1. Characteristics of BRFSS respondents and prevalence of overweight and obesity, Montana 1988-1993 and 1994-1999.

	1988-1993 (n=7,124) # (%)	1994-1999 (n=9,591) # (%)
Sex		
Male	3,016 (42)	4,086 (43)
Female	4,108 (58)	5,505 (57)
Age (years)		
$\geq 45$	3,414 (48)	4,921 (51)
<45	3,710 (52)*	4,670 (49)
Race		
White	6,749 (95)	9,030 (94)
Non-white	375 (5)	561 (6)
Overweight †		
Yes	2,998 (43)	4,520 (50)*
No	3,940 (57)	4,526 (50)
Obese ††		
Yes	688 (10)	1,280 (14)*
No	6,250 (90)	7,792 (86)

\*P <0.05

† Body mass index  $\geq 25.0$  kg/m<sup>2</sup>

†† Body mass index  $\geq 30.0$  kg/m<sup>2</sup>

## PREVALENCE OF DIAGNOSED DIABETES:

The prevalence of diagnosed diabetes increased from 4.2% in 1988 to 1993 to 5.3% from 1994 to 1999 — a relative increase of 26% (Figure 1). The increase in prevalence between the two time periods was higher for women than men (Figure 2). Diabetes increased among both younger (aged <45 years) and older persons (aged  $\geq 45$  years), but the increases among the younger individuals from 1.7% to 2.9% are particularly striking (Figure 3). The increase in diabetes reported among non-white respondents (7.5% to 9.4%) was greater than the increase of 4% to 5% reported by the white respondents (Figure 4). As anticipated, the prevalence of diabetes was highest among persons who were overweight; however, there was little change in the prevalence of diabetes in either

overall BMI are strong as risk factors for diabetes.<sup>14-15</sup> This dramatic rise in overweight/obesity will have a major impact on diabetes as well as cardiovascular disease in Montana. We can expect increasing prevalence rates diabetes over time — in that there is a lag-time between becoming obese or overweight and the onset of diabetes. Coronary heart disease rates have not decreased dramatically among persons with diabetes in the U.S. raising concerns about potential increases in heart disease mortality because of increasing rates diabetes.<sup>16</sup> Population-based public health strategies to address overweight, obesity and physical activity among Montanans are urgently needed.

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#### REFERENCES:

1. Harris MI: Diabetes in America: epidemiology and scope of the problem. *Diabetes Care* (Suppl 3):C11-C14, 1998.
2. Montana Department of Public Health and Human Services; Vital Records, 1991-1995.
3. Centers for Disease Control and Prevention: The burden of diabetes in Montana, 1996.
4. Burke JP, Williams K, Gaskill SP, Hazuda HP, Haffner SM, Stern MP: Rapid rise in the incidence of type 2 diabetes from 1987 to 1996. *Arch Intern Med* 159:1450-56, 1999.
5. Centers for Disease Control and Prevention: Trends in the prevalence and incidence of self-reported diabetes mellitus—United States, 1980-1994. *MMWR* 46:1014-18, 1997.
6. Harris MI, Flegal KM, Cowie CC, Eberhardt MS, Goldstein DE, Little RR, Wiedmeyer HM, Bryd-Holt DD: Prevalence of diabetes, impaired fasting glucose, and impaired glucose tolerance in U.S. adults: the Third national Health and Nutrition Examination Survey, 1988-1994. *Diabetes Care* 21:518-24, 1998.
7. Leibson CL, O'Brien PC, Atkinson E, Palumbo PJ, Melton LJ 3rd: Relative contribution of incidence and survival to increasing prevalence of adult-onset diabetes mellitus: a population-based study. *Am J Epidemiol* 146:12-22, 1997.
8. Mokdad AH, Ford ES, Bowman BA, Nelson DE, Engelgau MM, Vinicor F, Marks JS: Diabetes trends in the U.S.: 1990-1998. *Diabetes Care* 2000;23:1278-83.
9. Kehoe R, Wu SY, Leske MC, Chylack LT Jr. Comparing self-reported and physician-reported medical history. *Am J Epidemiol*;139:813-18, 1994.
10. Stewart AW, Jackson RT, Ford MA, Beaglehole R. Underestimate of relative weight by use of self-reported height and weight. *Am J Epidemiol*;125:122-26, 1987.
11. Ford ES: Characteristics of survey participants with and without a telephone: findings from the Third national Health and Nutrition Examination Survey. *J Clin Epidemiol* 51:55-60, 1998.
12. Helgersen S, McDowall J, Harwell T, Gohdes D, and the Diabetes Care Monitoring System team: Monitoring diabetes care in fee-for-service practices, Montana and Wyoming, 1999. *Diabetes* [abstract 908-P], 2000.
13. Helgersen SD, Harwell TS, Stringer RA, Gohdes D, McDowall JM: An electronic monitoring system supports improvements in diabetes care in physicians' offices: Montana, Wyoming, Pacific Islands, 1997-2000. International Symposium of computers and diabetes care, American Diabetes Association and the Mayo Clinic, 2000.
14. American Diabetes Association: *Diabetes Facts and Figures*. Alexandria, VA, American Diabetes Association, 1997.
15. Pi-Sunyer FX: Medical hazards of obesity. *Ann Intern Med* 119:655-60, 1993.
16. Gu K, Cowie CC, Harris MI: Diabetes and decline in heart disease mortality in US adults. *JAMA* 281: 1291-1297, 1999.

## LIMITATIONS:

There are a number of limitations to consider when interpreting these findings. Information regarding diabetes status, weight and height were self-reported and may be affected by recall bias or responses given to be socially desirable. Previous studies have found that self-reported diagnosed diabetes is reliable, while self-reported weight tends to be under-reported.<sup>9-10</sup> The prevalence of diabetes is likely to be underestimated in that adult Montanans without telephones are not included in the survey. These persons are likely to be of lower socio-economic status, which is associated with higher prevalence rates of both obesity and diabetes.<sup>11</sup> Persons with undiagnosed diabetes are not identified in the BRFSS survey. The findings from the 1988-1994 NHANES III study for the general U.S. population reported a prevalence of diagnosed diabetes of 5.1% and that another considerable proportion of persons (2.7% of the population) had undiagnosed diabetes or impaired fasting glucose (yet another 6.9%).<sup>6</sup> Increases in public awareness to diabetes and screening for diabetes may also explain some of the increase in prevalence over this time period. Although the classification of gestational diabetes in the BRFSS changed during the period under study, it is unlikely that this factor alone accounted for all the increase measured.

## CONCLUSIONS:

From the 1988 to 1993 time period to the 1994 to 1999 time period, the prevalence of diagnosed diabetes increased over 25% among adult Montanans. Increases were most dramatic among women, and persons aged <45 years, and in non-whites. Our findings are similar to those from a recent national study, which found similar increases in the prevalence of diabetes nationally.<sup>8</sup> Based on the 1988-93 and 1994-99 prevalence

estimates and the 1990 adult census population (690,904 persons aged 18 years), the total number of Montana adults with diagnosed diabetes has increased from approximately 29,700 to more than 36,600. The need for high quality diabetes care and thorough patient education will also increase as the number of patients increase. These services are critical for preventing, or at least delaying, complications for which persons with diabetes are at risk. These services can improve the quality of life for persons with diabetes.

To address this issue, the Montana DPHHS and the Mountain-Pacific Quality Health Foundation have implemented a program to assist primary care providers in monitoring the delivery of care for patients with diabetes — the Diabetes Care Monitoring System. This program has been shown to be effective in improving diabetes care process measures (e.g., foot examinations or pneumococcal immunization coverage) and in improving outcomes (e.g., reduced HbA1c values) in primary care practices.<sup>12-13</sup> In addition, the Montana DPHHS also has implemented a program to assist health care professionals who would like to improve their skills in providing diabetes education. For more information about the diabetes care quality improvement program please contact Janet McDowall, RN (406-248-1270; [jmcdowall@state.mt.us](mailto:jmcdowall@state.mt.us)) and for information on the diabetes education program please contact Marci Butcher, RD, CDE (406-444-6677).

The recent increase in overweight and obesity among adult Montanans is alarming. Over the past 11 years, the prevalence of overweight has increased by 11 percentage points (a 28% relative increase) and the prevalence of obesity has almost doubled. The trends suggest that this pounds-per-person epidemic is likely to continue. Both weight gain and

group from one time period to the other (Figure 5).

From 1988 to 1999, the prevalence of overweight and obesity increased dramatically among adult Montanans (Figure 6). In 1988, 40% of adult

Montanans were overweight while by 1999 this increased to 51%. Even more striking was the increase in the prevalence of obesity, which doubled during this time period from 8% of the adult Montana population to 15%, a 87% relative increase in just 11 years (Figure 6).

Figure 1. Prevalence of diagnosed diabetes among adult Montanans, 1988-93 and 1994-99.

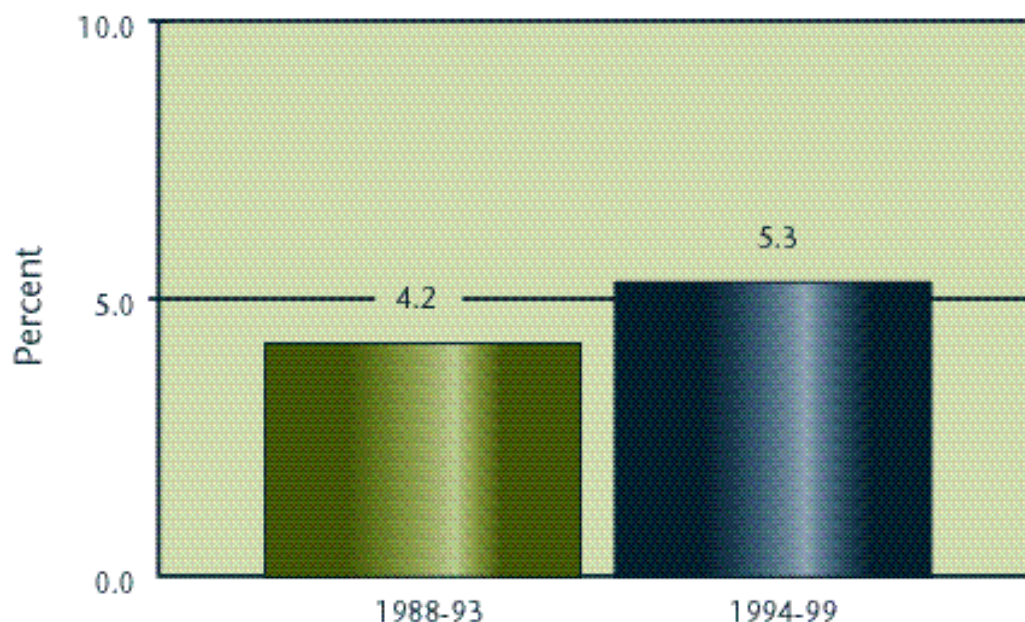


Figure 2. Prevalence of diagnosed diabetes among adult Montanans, by sex, 1988-93 and 1994-99.

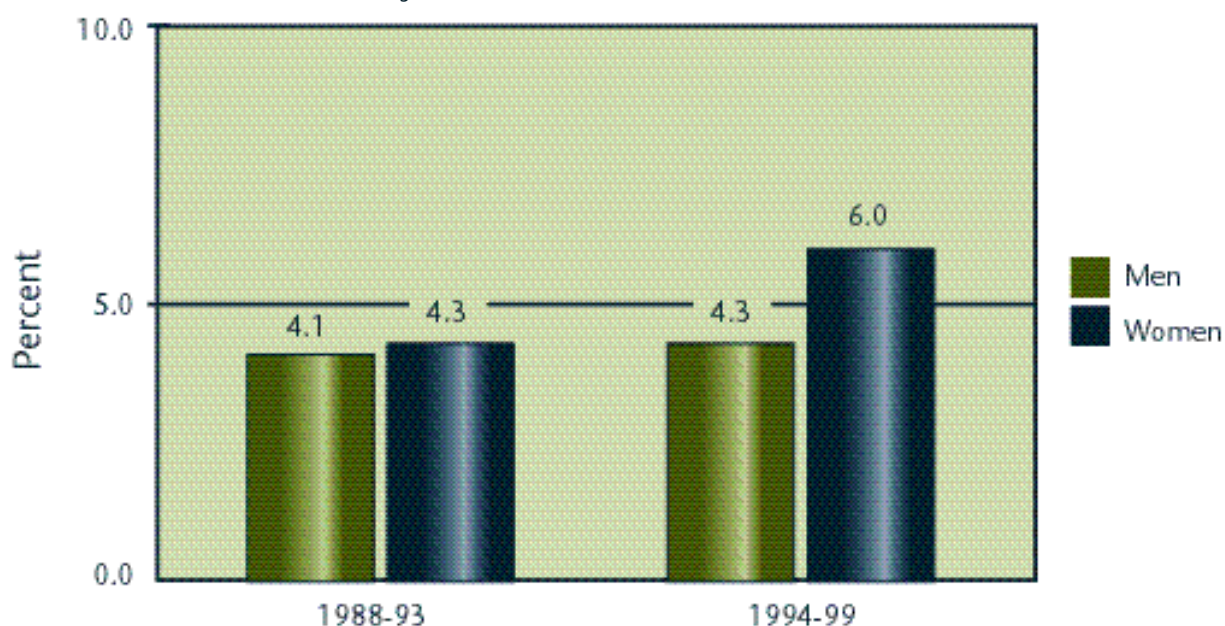


Figure 3. Prevalence of diagnosed diabetes among adult Montanans, by age, 1988-93 and 1994-99.

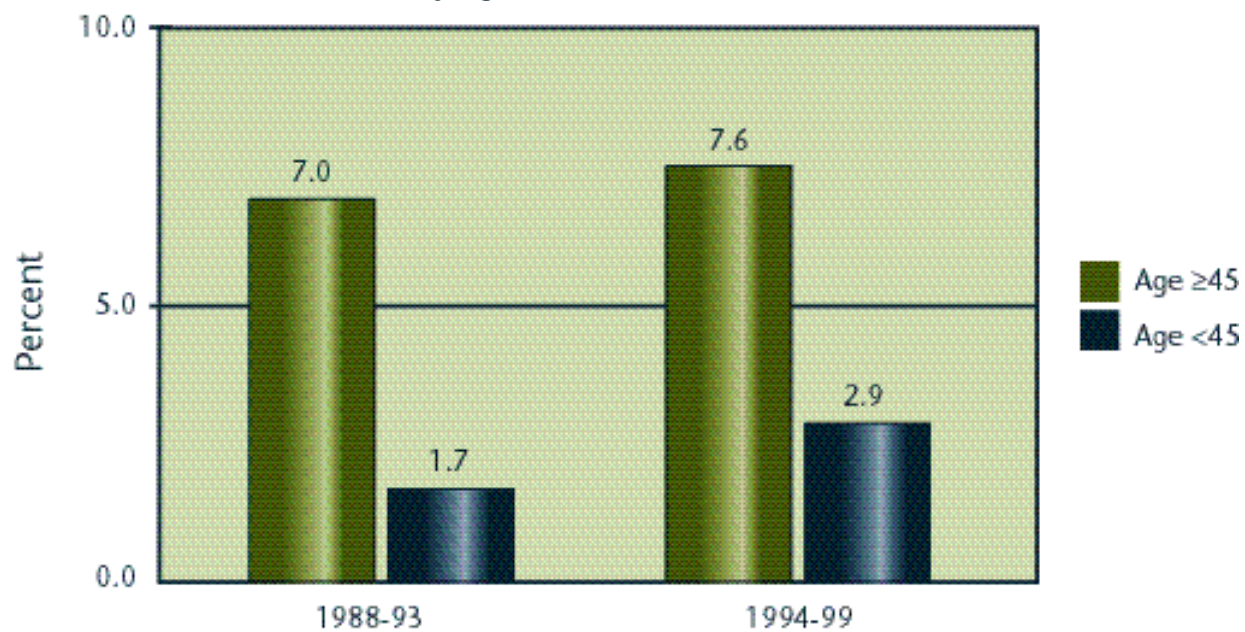


Figure 4. Prevalence of diagnosed diabetes among adult Montanans, by race, 1988-93 and 1994-99.

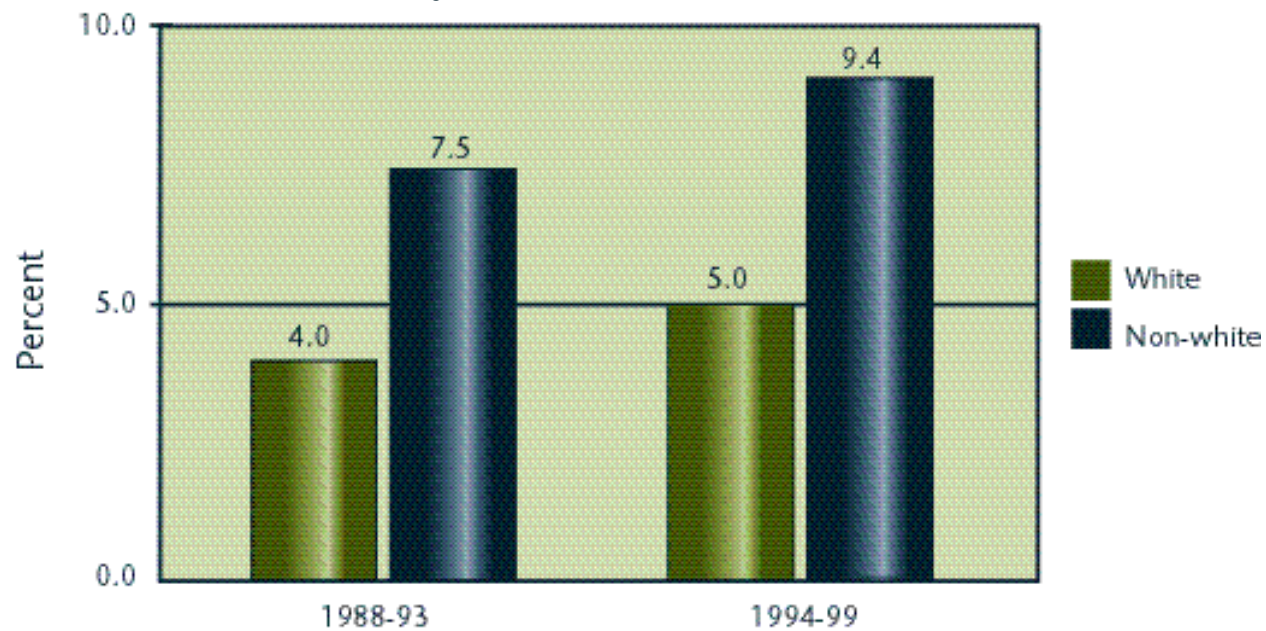


Figure 5. Prevalence of diagnosed diabetes among adult Montanans, by overweight and obesity, 1988-93 and 1994-99.

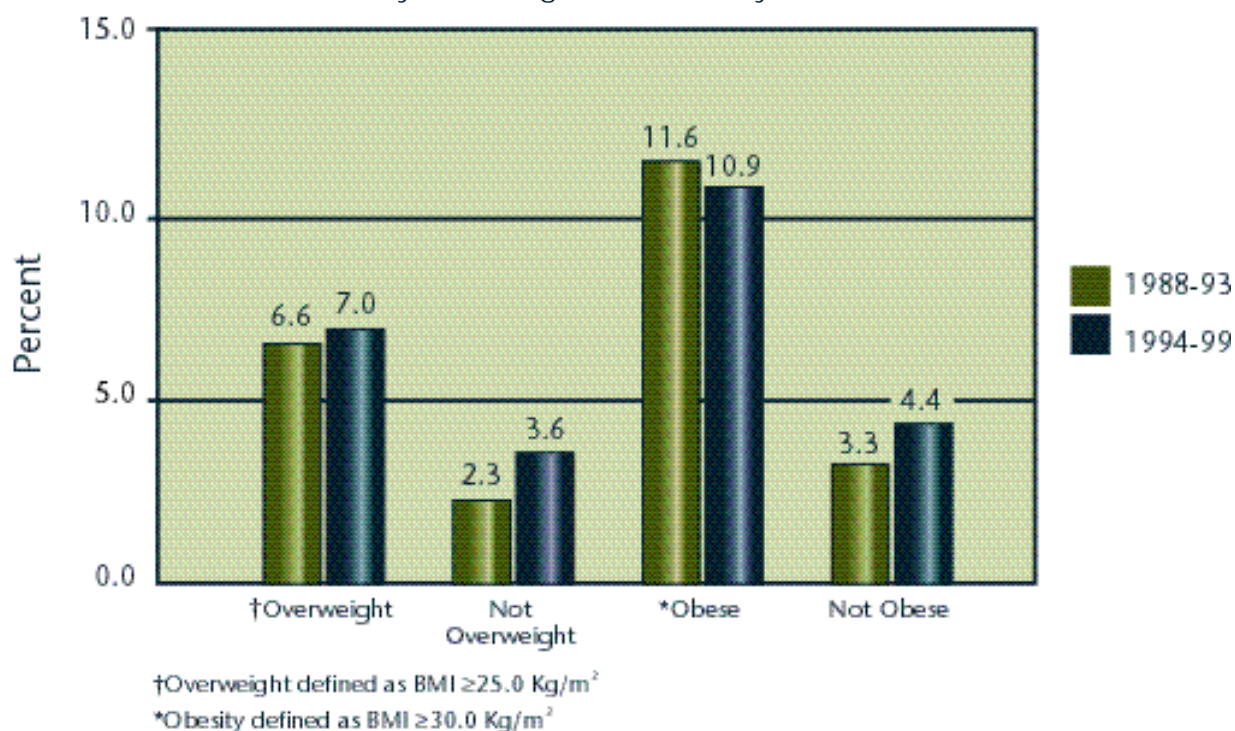
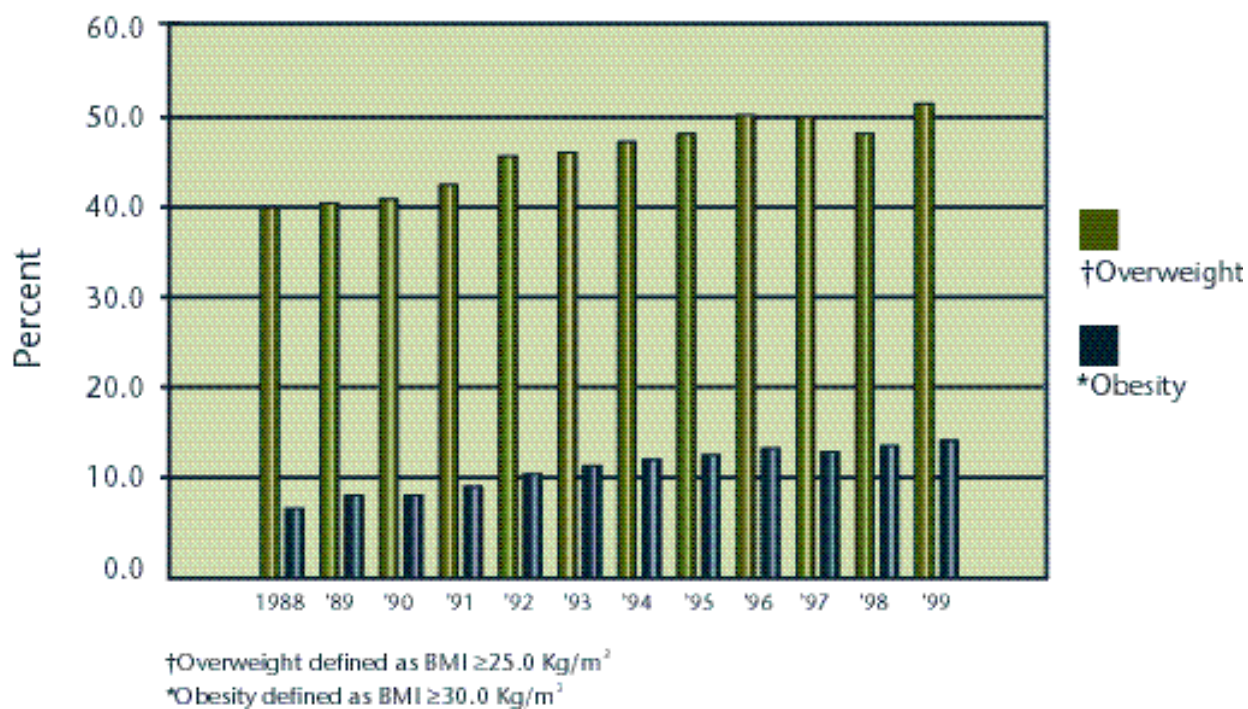


Figure 6. Overweight and obesity among adult Montanans, by year, 1988-1999.



## WHAT IS THE MONTANA DIABETES PROJECT AND HOW CAN WE BE CONTACTED:

The Montana Diabetes Project is funded through a cooperative agreement with the Centers for Disease Control and Prevention, Division of Diabetes Translation (U32/CCU815663-02). The mission of the Diabetes Project is to reduce the burden of diabetes and its complications among Montanans. Our web page can be accessed at <http://ahec.msu.montana.edu/diabetes/default.htm>.

For further information please contact us at:

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